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## CERTIFICATE

This certificate is issued in support of an application for Patent registration in a country outside New Zealand pursuant to the Patents Act 1953 and the Regulations thereunder.

I hereby certify that annexed is a true copy of the Provisional Specification as filed on 20 December 2002 with an application for Letters Patent number 523373 made by ALTO PLASTICS LIMITED.

Dated 7 January 2004.

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*Neville Harris*

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**PROVISIONAL SPECIFICATION**

**"Tamper Evident Closure Assemblies"**

We, **ALTO PLASTICS LIMITED**, a company duly incorporated under the laws of New Zealand of 19 Keeling Road, Henderson, Auckland, New Zealand, do hereby declare this invention to be described in the following statement:

The present invention relates to improvements in or relating to tamper evident closure assemblies and to related components, products, methodologies and the like.

There has been a trend towards liquid dispensing containers (hereafter "bottles") of a kind having a liquid content capable of being dispensed (e.g.; including by pouring, sucking and/or squeezing) reliant on a pull out or the equivalent outlet nozzle of a closure assembly.

It is usual with all such containers to provide some semblance of protection for the outlet nozzle if the container is not to be one to be filled by the purchaser himself or herself, i.e.; where a container is being sold as a throwaway or a potential container for reuse.

With such a nozzle outlet assembly it is also usual for some form of seal system to be utilised to prevent contamination of the liquid content of the bottle and/or accidental or deliberate egress of liquid therefrom without evidence of tampering. Usually such a seal system involves a form of lift and peel seal (e.g.; whether of a foil, a laminate or a polycell material (e.g.; "polycell liners")). Such seals can be provided with a tab such that upon removal of, for example, a closure assembly which carries the outlet nozzle, the seal can be removed. Other forms involve a foil or other pierceable membrane capable of being broken without any removal of all of the closure assembly, i.e.; it can be punched through by an appropriate manipulation of the outlet nozzle itself and/or some inner extension thereof.

Such bottles usually have a neck with an external thread engageable by part of the closure assembly. The containers usually in the form of a bottle or flask and at least most components of the closure assembly are usually manufactured from a fast cycle injection plastics material such as a suitable food grade polypropylene or polyethylene. Reference herein therefore to "moulded components" preferably refers to materials of a plastics type but where appropriate such materials can be substituted by other materials (whether metal or otherwise). Likewise, membranes as referred to herein as being used to provide a seal of the bottle itself can be of any suitable material whether adapted for tear off, piercing or otherwise.

The present invention recognises an advantage arising from a capability of defining in a preassembled form of such a tamper evident closure assembly (eg; in a humidity controlled environment) a space not capturing much moisture prior to association with a bottle, such association, particularly where there is to be a hot-filling of the bottle, being in humid conditions. In so doing the volume of humid air captured between any such assembly and the sealed bottle can be minimised.

In a first aspect the present invention consists in a **one piece overcap moulding** having  
an overcap region,  
a internally threaded skirt region, and  
a frangible link between the overcap and the threaded skirt region, and

(optionally) a tamper evident tamperband dependent from the threaded skirt region, wherein there is no perforation in the overcap region, the threaded skirt region nor the frangible link

In another aspect the present invention consists in a **one piece overcap moulding** of or for a drink dispensing bottle having

an overcap region,

a internally threaded skirt region, and

a frangible link between the overcap and the threaded skirt region, and

(optionally) a tamper evident tamperband dependent from the threaded skirt region

wherein there (preferably, provided) (notionally or actually) there is or is to be a fluid tight seal between the overcap and other closure assembly component(s) of and/or of the bottle itself), at last the overcap region and its frangible link to the internally threaded skirt region is fluid tight.

Preferably the frangible link is a band that completely circumvents or substantially completely circumvents below the bottom periphery of the overcap region (i.e.; if it only substantially circumvents there may for the rest of the periphery be a simple frangible connection between the overcap region and part of the internally threaded skirt region).

Preferably the bottom periphery of the overcap region internally includes a bead, lip, shoulder or the like adapted to act as a retention feature. In less preferred forms it can be a channel form to coact with a complementary bead, lip or the like that is carried by a separate component.

In still a further aspect the present invention consists in a **closed container** which includes a one piece overcap moulding in accordance with any form of the present invention providing protection for a dispensing nozzle of drink container, eg; bottle.

In still a further aspect the present invention consists in a **one piece overcap moulding** having one or more or all of the features substantially as hereinafter described with reference to any one or more of the accompanying drawings.

In another aspect the present invention consists in a **closed container assembly** containing a liquid, said assembly comprising or including

a container with the liquid, the container having an externally threaded neck with an open mouth,

a seal member over and sealing the open mouth, and

a closure assembly screw engaged to the container about the neck and extending over the seal member sealed mouth,

wherein the closure assembly is defined by

(i) a first moulding providing

(a) an overcap,

- (b) a frangibly removable region or frangible connection ("frangible region") connecting to a lower periphery of the overcap,
  - (c) an internally threaded skirt connecting to the overcap via the frangibly region, and
  - (d) (optionally) a tamper evident collar (eg; "tamperband") severable from the internally threaded skirt,
- (ii) a nozzle providing outlet component ("nozzle component"), and
  - (iii) an insert to hold the nozzle component so that it can be manually shuttled between a dispensing and non dispensation condition relative thereto, said insert
    - (I) releasably retaining a or the lower periphery of the overcap, and
    - (II) peripherally sealing internally of the first moulding below the frangibly region and above the internally threaded region of the skirt,

and wherein when the seal member is no longer sealing the open mouth (whether through removal or rupture), in one condition (the dispensing condition), the nozzle component and insert component allows liquid egress and, in a second condition (the non-dispensing condition), the nozzle component and insert component allows at least substantially no liquid egress.

Preferably the liquid egress is first between part of the nozzle component and the insert and thereafter, after entry into at least one inlet in the nozzle out of an outlet of the nozzle.

Preferably the tamper evident collar is present and preferably it severs from the internally threaded skirt upon any substantial attempt to unscrew the threaded skirt from the externally threaded neck of the container.

Preferably the seal member has been brought into juxtaposition prior to sealing the open mouth by having being carried by the first moulding, ie; preferably the first moulding (i) includes or has included the seal member.

Preferably provision is made for unscrewing the closure assembly from the container thereby to allow the peel removal of the seal member.

In other forms of the present invention some rupturing capability can be provided whereby the nozzle component itself can be used in moving between an as supplied condition or a closed condition to a condition that will allow the egress of liquid to rupture the sealing member.

Other forms of removal of the seal member however can be provided.

The present invention therefore includes the use of a closure assembly as previously defined with a container of a kind as previously defined thereby providing the potential of a closed container assembly as aforesaid.

In yet a further aspect the present invention consists in a **method of closure of a container** so as to provide a closed container assembly as aforesaid, said method including the steps of applying a closure assembly as aforesaid to the container after filling the container at least to a substantial extent with a liquid and prior to, during or subsequent to such application sealing the seal member to the mouth of the container. Preferably the sealing is by induction welding.

In another aspect the present invention consists in a **closed container assembly** containing or to contain a liquid, said assembly comprising or including

a container with the liquid, the container having an externally threaded neck with an open mouth, and

a closure assembly screw engaged to the container about the neck and extending over the mouth,

**wherein** the closure assembly is defined by

- (iv) a first moulding providing
  - (a) an overcap,
  - (b) a frangibly removable region or frangible connection ("frangible region") connecting to a lower periphery of the overcap,
  - (c) an internally threaded skirt connecting to the overcap via the frangibly region, and
  - (d) (optionally) a tamper evident collar severable from the internally threaded skirt,
- (v) a nozzle providing outlet component ("nozzle component"), and
- (vi) an insert to hold the nozzle component so that it can be manually shuttled between (at least) a dispensing and non dispensation condition relative thereto, said insert
  - (I) releasably retaining a or the lower periphery of the overcap, and
  - (II) peripherally sealing internally of the first moulding below the frangibly region and above the internally threaded region of the skirt,

**and wherein** in one condition (the dispensing condition), the nozzle component and insert component allows liquid egress and, in a second condition (the non-dispensing condition), the nozzle component and insert component allows at least substantially no liquid egress.

In another aspect the present invention consists in an **assembly** engageable with an externally threaded necked container, said assembly having

*an overcap defining moulding* having an extended skirt with an internal thread adapted to screw engage the external thread of a suitable said container,

*an insert component* retained or retainable by the overcap defining moulding, and

*an outlet nozzle component* carried by the insert and movable relative thereto between at least two conditions, and

(optionally) *a seal member* for the mouth of an appropriate complementary said container, wherein the overcap defining moulding, insert component, nozzle component are preassembled such that at least part of the nozzle component and at least some (preferably most or all) of the insert component is in a substantially enclosed space between part of the overcap defining moulding and the seal member yet the internal thread of the skirt can screw engage the external thread of an appropriate complementary said container to have its mouth sealed by the seal member,

and wherein the overcap defining moulding defines an overcap frangibly detachable in a region of its skirt in a tamper evident manner from at least the insert component retaining region and the internally threaded region of its skirt,

and wherein, when so fitted to an appropriate said container, the overcap can be removed in a tamper evident manner thereby enabling the nozzle component to be moved relative to the insert to thereafter be capable of being shuttled between dispensing and non dispensing conditions.

Preferably the overcap defining member is moulded in a plastics material.

Preferably a circular periphery of the insert component engages in a clip fit, press or tight fit, welded, glued, or other manner with the interior of the overcap defining moulding.

Preferably that engagement for the purpose of retaining the insert component within the overcap prior to engagement thereof with a said container.

Preferably a peripheral lower region of the overcap part of the overcap defining moulding itself is engageable with a complementary part of the insert component such that after frangible detachment in a region of its skirt (in a tamper evident manner) the overcap can be removed therefrom and can, if desired, be replaced or relocated.

Preferably the means of frangible detachment includes a peripheral tear strip between the lower extremity of the overcap part of the overcap defining moulding and that part of the skirt (whether as a unitary part or otherwise) of the skirt. Alternatively the frangible detachment can be by twisting off or squeezing off of the overcap.

Preferably the overcap defining moulding includes as a lower most extension of its skirt a collar defining region adapted to be frangibly detachable as a tamper evident collar or tamperband from that region of the skirt with the internal thread such that should there be unauthorised loosening of the assembly from an appropriate container there is a tamper evident separation of at least of the collar or tamperband from the remainder of the skirt.

In another aspect the present invention consists in **an assembly** engageable with or engaged with a necked container, said assembly having

*an overcap defining moulding* having an extended skirt with an internal means adapted to engage or engaging the exterior of the neck of a suitable said container,

*an insert component* retained or retainable by the overcap defining member to seal or sealing with the overcap defining moulding, and

*a nozzle component* carried by the insert and movable relative thereto between at least two conditions one of which seals to effect a seal with the insert component to effect closure of a liquid passageway, and

(optionally yet preferably) *a seal member* for an otherwise open mouth of or of a said necked container carried in or having been carried in the overcap defining moulding and/or insert component.

In a further aspect the present invention consists in **a method of providing a liquid dispensing assembly** having a container and a closure assembly with an overcap feature for a dispensing nozzle, said method comprising or including

filling said container having an externally threaded neck with a liquid, and

engaging with the external thread of the container a preassembled closure assembly to effect closure, the closure assembly having the following features:

- (vii) a first moulding providing
  - (a) an overcap,
  - (b) a frangibly removable region or frangible connection ("frangible region") connecting to a lower periphery of the overcap,
  - (c) an internally threaded skirt connecting to but frangibly separable from the frangibly region, and
  - (d) (optionally) a tamper evident collar severably the internally threaded skirt,
- (viii) a nozzle providing outlet component ("nozzle component"), and
- (ix) an insert to hold the nozzle component so that it can be manually shuttled between a dispensing and non dispersion condition relative thereto, said insert
  - (I) releasably retaining a or the lower periphery of the overcap, and
  - (II) peripherally sealing internally of the first moulding below the frangibly region and above the internally threaded region of the skirt,

**wherein** an extended skirt region of the overcap defining moulding engages as a tamper evident collar with complementary engagement means of the container such that should thereafter the assembly be unscrewed such collar will be retained or will rupture at least in part from the overcap defining moulding,



and wherein between the overcap and the internally threaded region of the skirt of the overcap defining member there is a frangibly detachable region capable in a tamper evident way of being frangibly released to allow thereafter the removal of the parts of the insert and the nozzle component that hitherto were enclosed thereunder.

Preferably the preassembled closure assembly includes a seal member adapted to be juxtaposed over an open mouth of the container.

Preferably said seal member seals to the container as a result of a welding or like procedure.

Preferably said insert in any of the forms of the present invention seals to the overcap defining moulding reliant upon one or more of a clip fit, press or tight fit, a shoulder retention, adhesive fixing, and a suitable welding (eg; induction, friction, ultrasonic, etc.).

Persons skilled in the art will appreciate the other aspects of the present invention within the scope of the present invention. These include commodities of commerce being such filled containers. Other uses includes the recycling of such containers for casual use by a purchaser of it in an original form.

This invention may also be said broadly to consist in the parts, elements and features referred to or indicated in the specification of the application, individually or collectively, and any or all combinations of any two or more of said parts, elements or features, and where specific integers are mentioned herein which have known equivalents in the art to which this invention relates, such known equivalents are deemed to be incorporated herein as if individually set forth.

Preferred forms will now be described with reference to the accompanying drawings in which;

Figure 1 shows a closure assembly in accordance with the present invention in section from one elevation, there being shown also a sealing member carried by the one piece overcap defining member internally of its skirt,

Figure 2 is a similar view of the arrangement shown in Figure 1 but rotated by 90°, both Figures 1 and 2 showing the nozzle component in a condition relative to the insert as it might be provided prior to application to a bottle in a hot fill line, Figure 2 however showing the sealing member as lowered onto and preferably induction welded through the overcap moulding to the mouth regions of a suitable complementary container shown in part,

Figure 3 is a similar view to that of Figure 2 but showing the nozzle assembly moved downwardly relative to the insert (as would only in use occur after removal of the overcap after removal of the frangible link or band); the relative position between the nozzle component and the insert as shown in Figure 3 being a closed condition which seals between the two reliant upon what otherwise are retention shoulders as described with respect to the purchased condition of Figure 2,

Figure 4 is a similar view to that of Figure 3 but showing the container in an open drinking

position, showing the overcap removed, etc.,

**Figure 5** is an exploded view that shows the three preferred components each provided as a moulding (preferably the assembly also being provided with a disc sealing member), showing how the nozzle outlet moulding can be inserted down into the insert moulding to the condition as shown in Figures 1 and 2 prior to association of the insert carrying the nozzle component within the one piece overcap moulding,

**Figure 6** is a perspective view from the outside of a one piece overcap defining moulding in accordance with the present invention, there being shown a tag adapted to be gripped to allow the removal of the frangible link as a band (preferably completely) around the lower periphery of the overcap between the overcap and the skirt, Figure 6 also showing how a tamper band is preferably integrally provided at the bottom of the knurled or otherwise grip enhanced periphery of the internally threaded skirt,

**Figure 7** is a side elevation of the moulding as shown in Figure 6,

**Figure 8** is a further elevation of the moulding shown in Figures 6 and 7,

**Figure 9** shows the assembly as in Figure 4 or some approximation thereto in its drink dispensing condition, and

**Figure 10** is a similar view to that of Figure 3 but with the nozzle component relative to the insert in its closed condition that seals against liquid egress and with the overcap replaced,

In the preferred form of the present invention the seal member can be of any of the conventional types used with or without welding to the top of the mouth of a container. It can be provided with a tang, tab or the like to allow its easy peel removal in whole or in part once the cap assembly has been disengaged (albeit while leaving the tamperband behind). In other forms, if desired, a seal piercing provision can be provided to the nozzle component such that it has the ability to rupture any seal member (whether polycell, foil, plastics, or otherwise) closing the top of a mouthed container.

In the preferred form of the present invention each of the components is of polyethylene or polypropylene. As can be seen in Figure 5 there are three main moulded components namely, the overcap defining moulding 1, the insert 2 (itself a moulding), and the nozzle component 3 (again preferably a moulding). Not shown in Figure 3 is a standard or more or less standard polycell or other type disc seal 17 to be carried in a manner hereinafter described.

In the preferred form of the present invention the component 1 includes an overcap 4 with a retention shoulder or bead 5 adapted to underlie a retention shoulder 6 of the insert 3. This provision is to allow the removal and replacement of the overcap 4 as and when required after removal of the band 7 under the action of the pull tab 7A which likewise is part of said frangible region. As can be seen this region 7 connects frangibly a bottom peripheral region 8 of the overcap 4 through to a

frangibly connected peripheral skirt 9 with its internal thread 10 to engage the external thread 11 of a neck of a suitable container.

In the condition shown in Figure 2, and for that matter Figure 1, the nozzle component 3 is in its preferred as supplied condition. In the condition shown in Figures 1 and 2 the nozzle component 3 is retained against removal by the interaction at 15. It is this, as supplied, condition with that component 3 above the disc seal 17 carried by the region 9 internally thereof, that would be supplied to a hot line user of the overall assembly and would still be the relative condition between the nozzle component 3 and the insert 2 when on sold together with a sealed liquid containing bottle (of any appropriate shape) but with complementary features for engagement with the internal thread of the skirt 9.

The insert 3 however is movable relative to the insert 2 through and/or to at least two conditions, one of which is shown in Figure 3 being a condition that pierces the foil and which also is the closed non liquid dispensing preferred condition (see Figure 10) at which stage, if desired, the overcap can be replaced after having previously having been removed after the removal of the band 7.

In use, the outlet 12 of the component 3 only allows outflow of liquid as shown in Figure 9 and this requires the region 18 of the nozzle component to be clear of the retention shoulder 14 (preferably the lower region of a frustoconical flange). In the condition as shown in Figures 3 and 10 there is a liquid tight abutment occurring between 14 and 15.

Providing a seal in all assembled conditions is the interface 16 between the threaded skirt 9 of the moulding 1 and the insert 3. This can be achieved in any appropriate way including friction welding, induction welding or the like.

It is envisaged that an assembly in a condition as shown in Figure 1 will be supplied to a bottler. This would include the disc seal member 17 appropriately positioned by a tight fit or other means within the interior of the skirt 9. Thereafter that product in humid hot fill conditions can then be directly screwed on to a complementary container and induction welding will allow the collapse and seal of the disc seal member 17 on to the open mouth of a container, ie; as in the condition shown in Figure 2. This can be a consequence of induction or ultrasonic welding through the overcap moulding.

With the seal member as carried during such closure fitment and the substantially enclosed volume of much of the as supplied unit, little humid air to pool condensate is available to cause concern.

Once a bottle is purchased with the assembly closing the container in a condition as shown in Figure 2 removal of the band 7 under the pulling action of the pull tab 7A allows the removal of the overcap 4 and thereafter the depression of the nozzle assembly to the condition as shown in

Figure 3. This can occur either without removal of the remainder of the closure assembly or not.

If the seal member 17 is to be pulled free prior to the use of the closure assembly between the conditions shown in Figures 3 (closed) and Figures 4 and 9 (the open drinking position) unscrewing and thus evidence of tampering will ensue.

If however otherwise the nozzle component is simply pressed down from its as supplied condition as in Figures 1 and 2 to the condition as in Figure 3 there will be rupturing of the seal 17.

The present invention is applicable to the assembly and the overcap defining moulding irrespective of whether or not there is to be piercing or peel removal.

It can be seen therefore with the prospect of preassembly of the closure assembly together with a seal member there is the prospect that the enclosed regions of the closure assembly are not susceptible to the intrusion of the humid atmosphere at a hot fill line when liquids (at for example 80°C) are dispensed into the containers prior to association with the seal member. This means therefore there is little water vapour beyond the ordinary available to condense within the enclosed space of the closure member itself. Also, with the closure assembly being capable of being coupled to the seal member itself (even if only a loose fit) and with little space confined by the seal member above itself, and no space below it once it has been sealed about the mouth of the container, there is little in the way of humid atmosphere being confined that can lead to condensation and thus water pooling on the seal member.

Such pooling in the past has been considered undesirable owing to the impression it provides to a consumer and of course the prospect that it could be a pool supportive of bacteria.

It is believed that the present invention will therefore find widespread acceptance.

DATED THIS 20th DAY OF December 2002  
AJ PARK

PER *J. Finlay*  
AGENTS FOR THE APPLICANT

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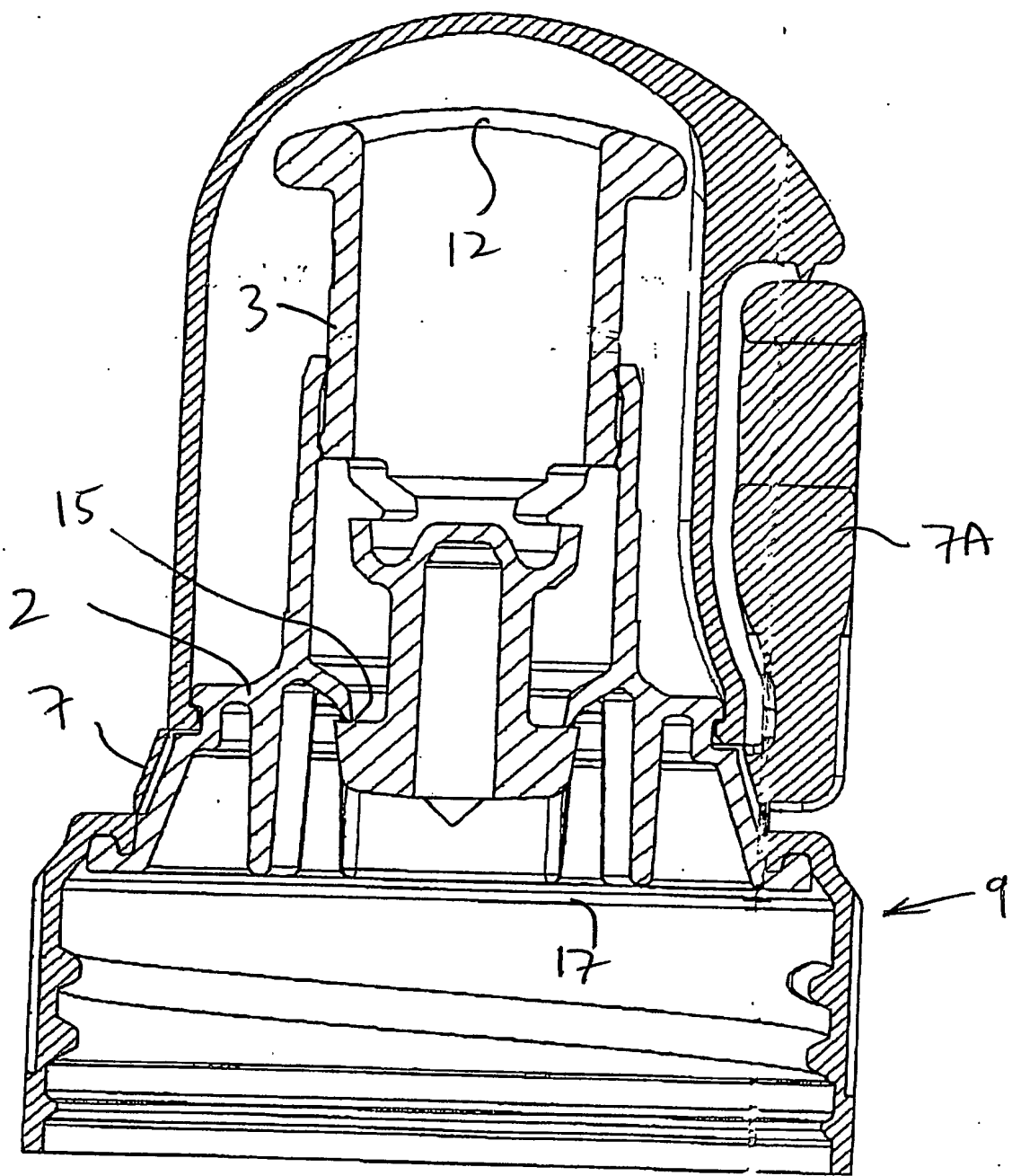


FIG 1

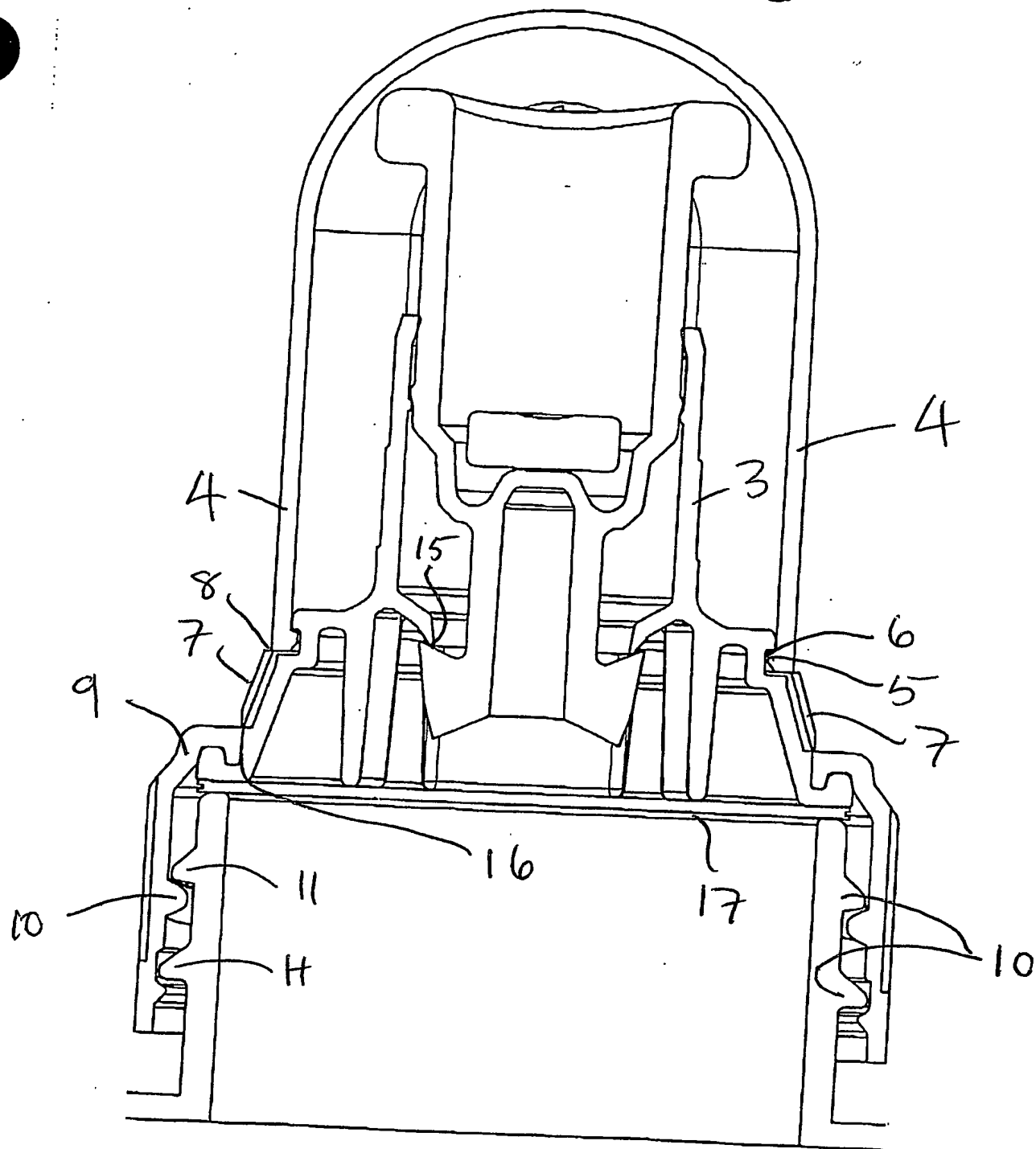


Fig 2

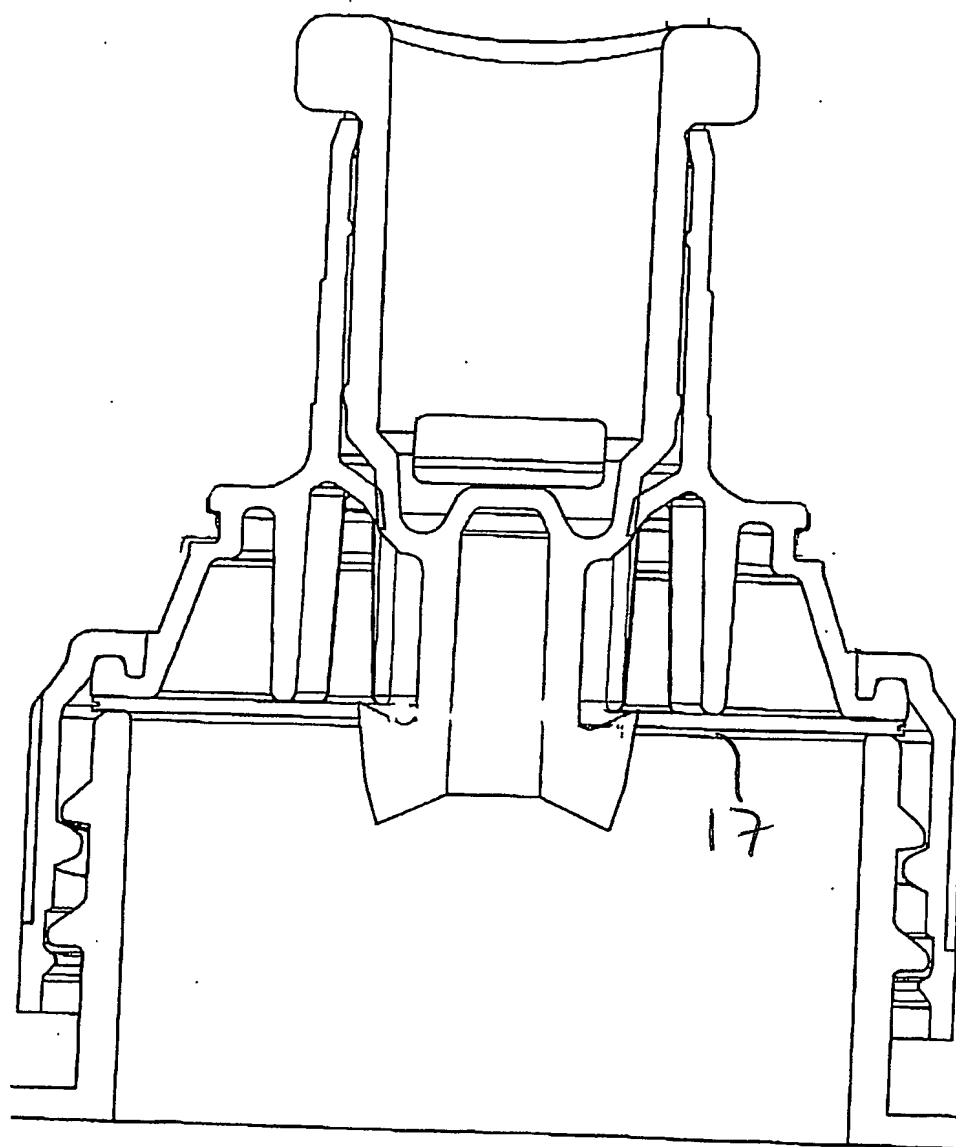


Fig 3

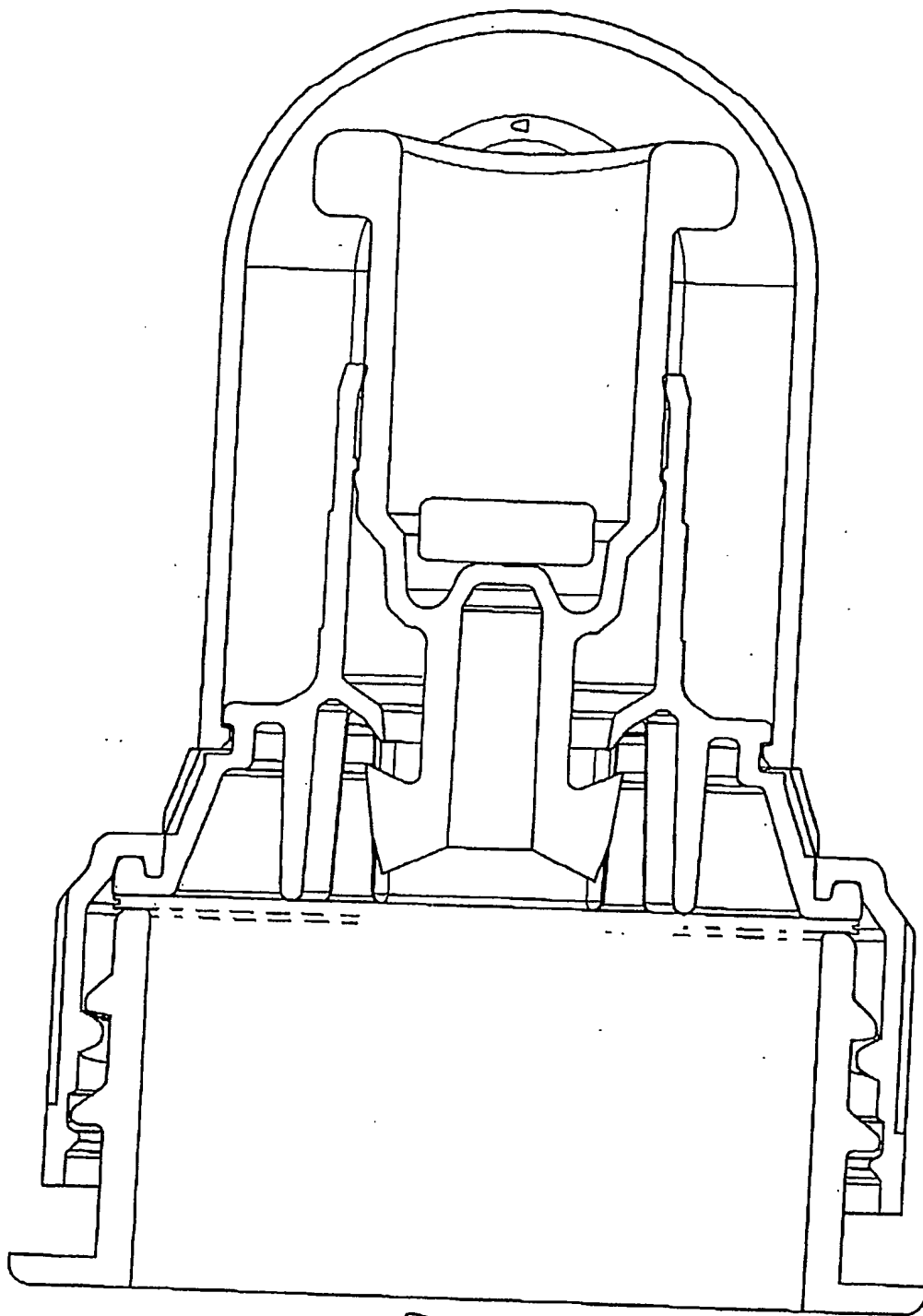


FIG 4



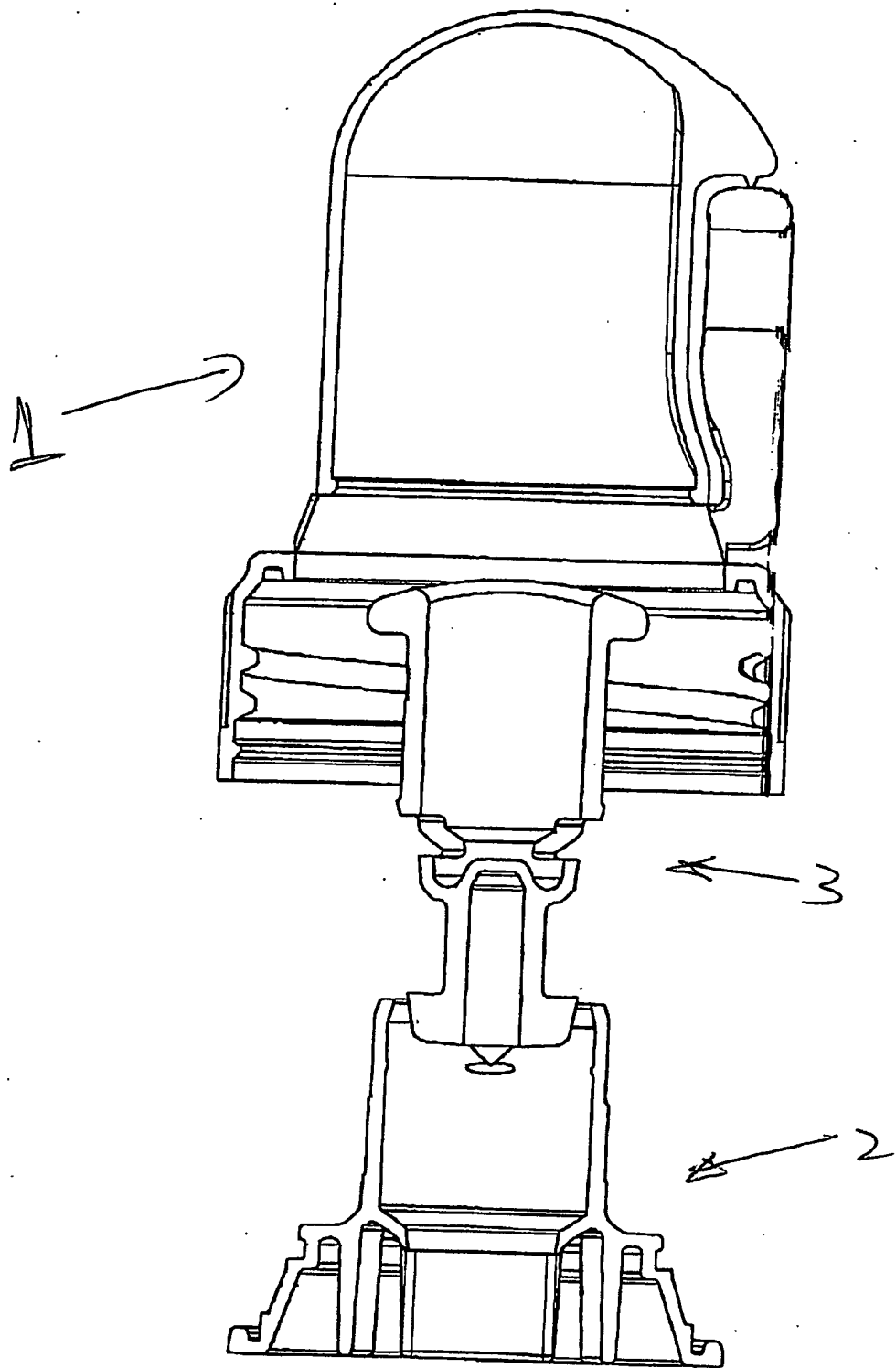


FIG 5

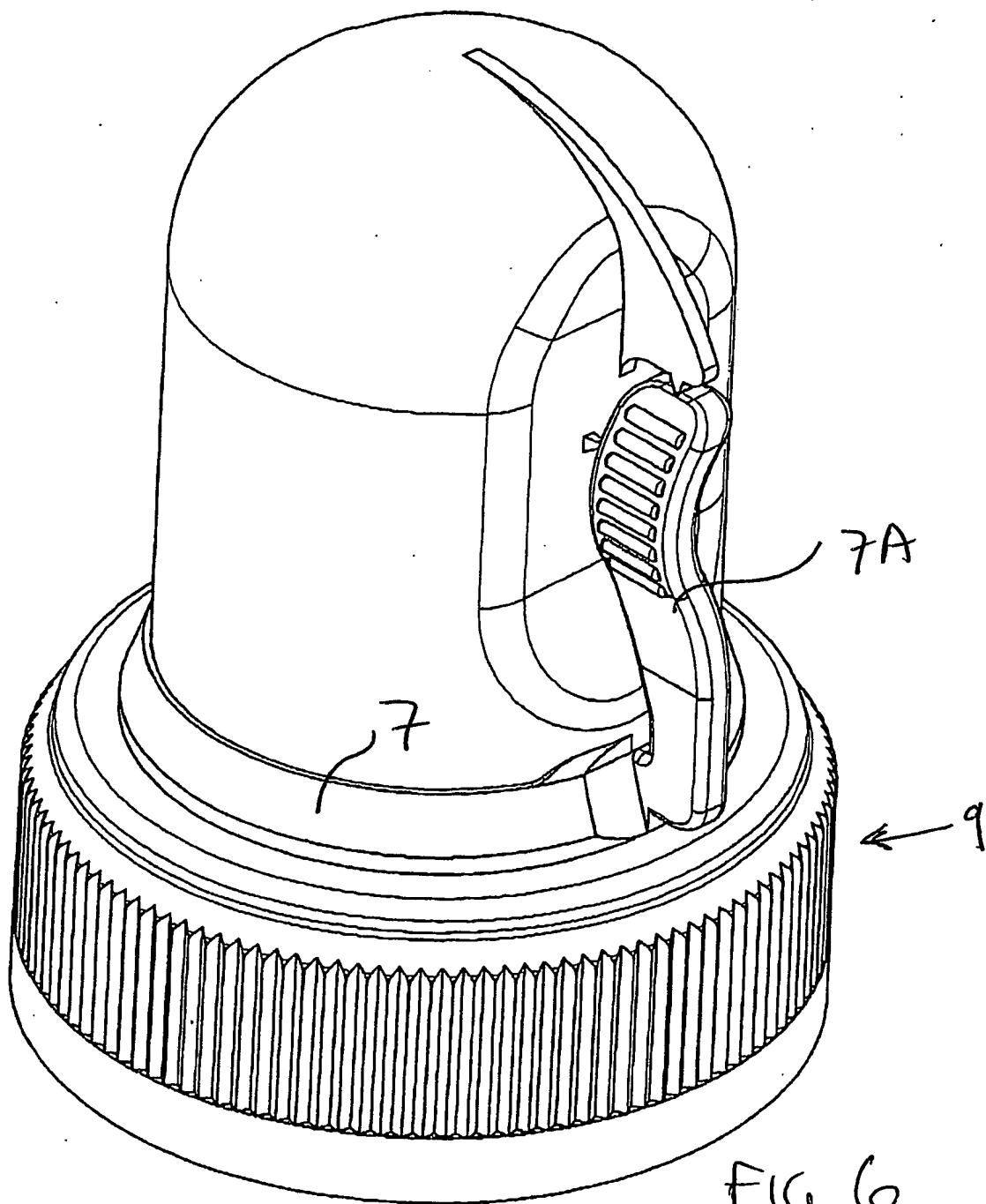


FIG 6

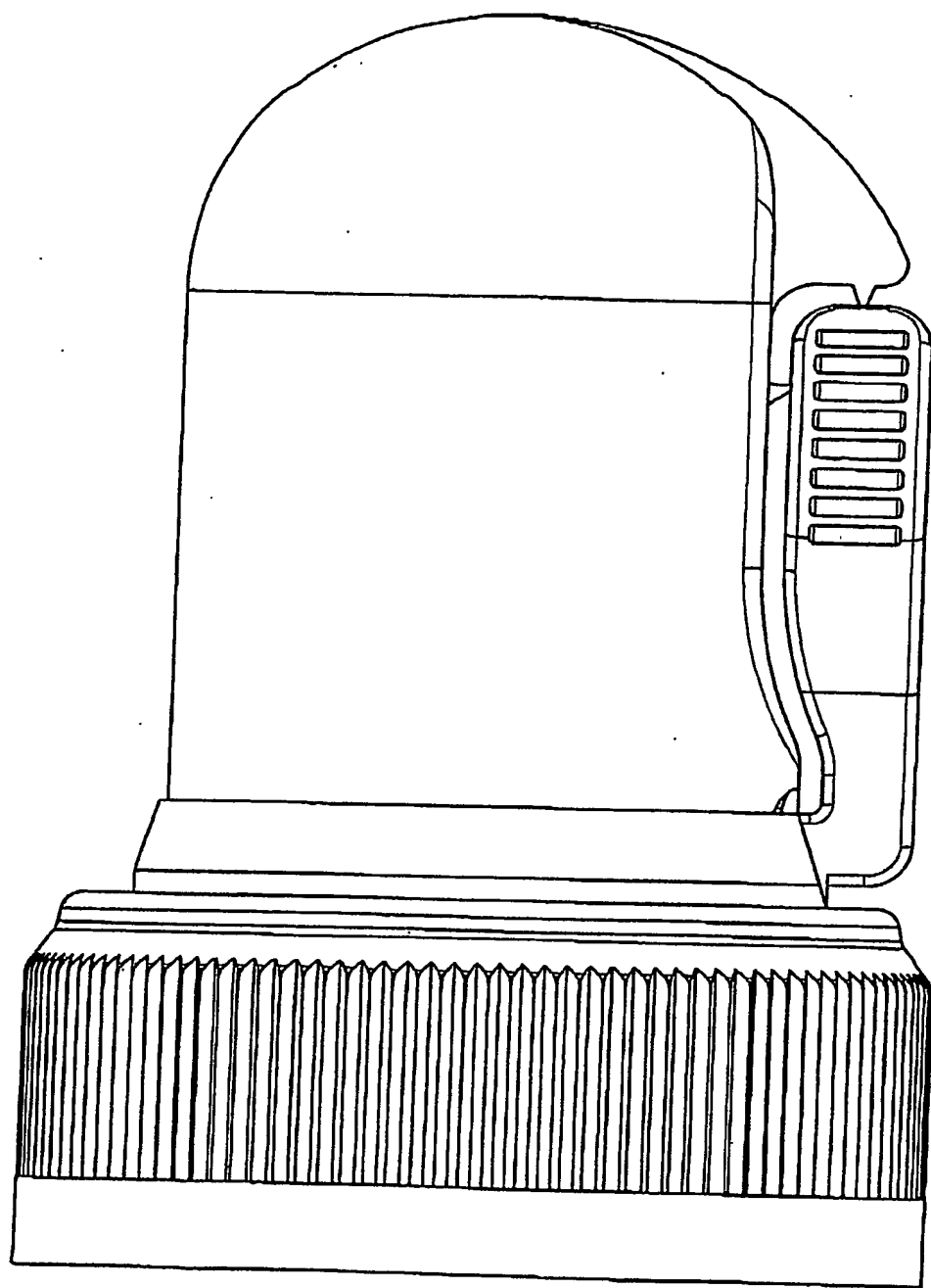


FIG 7

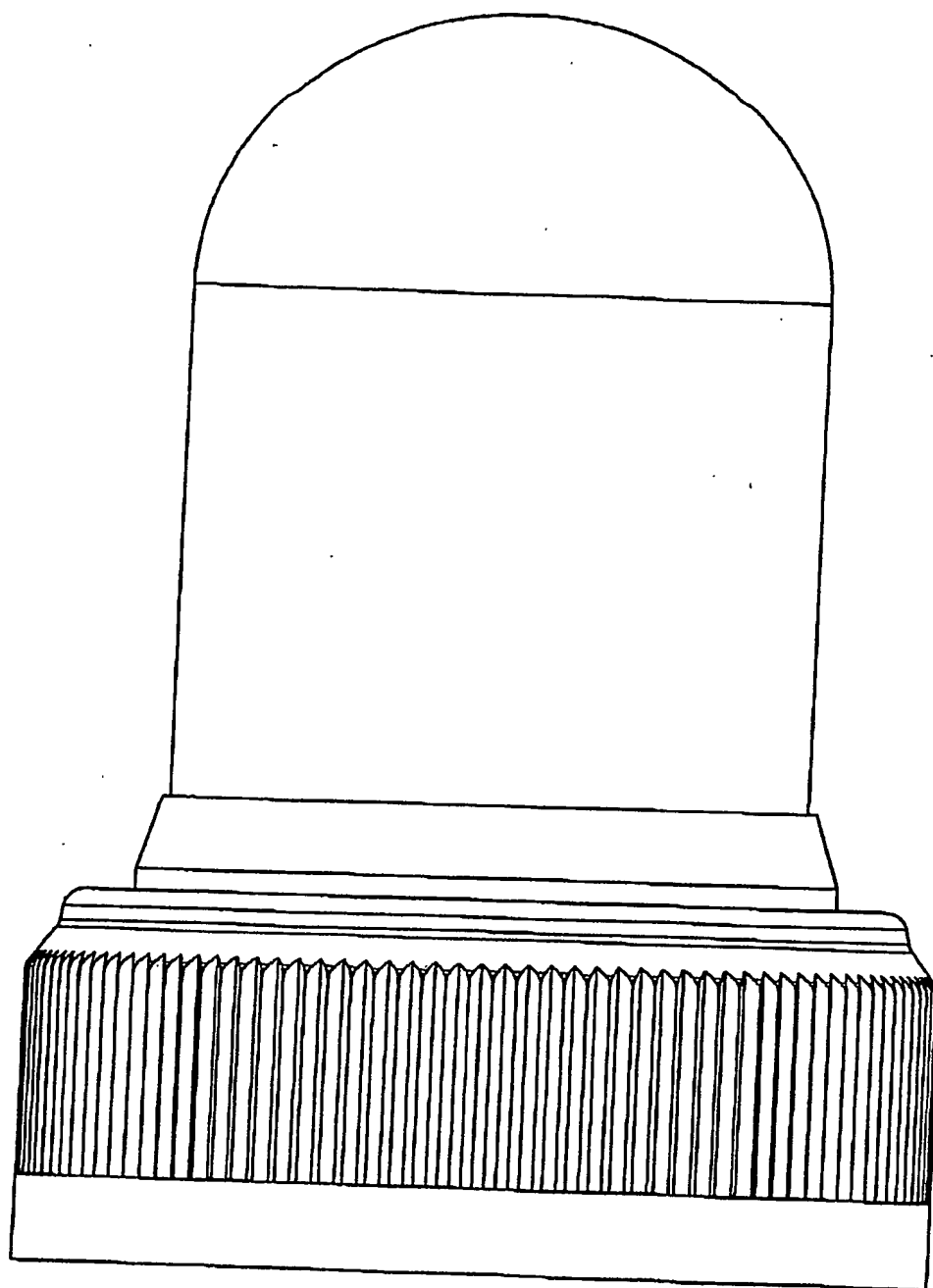


FIG 8

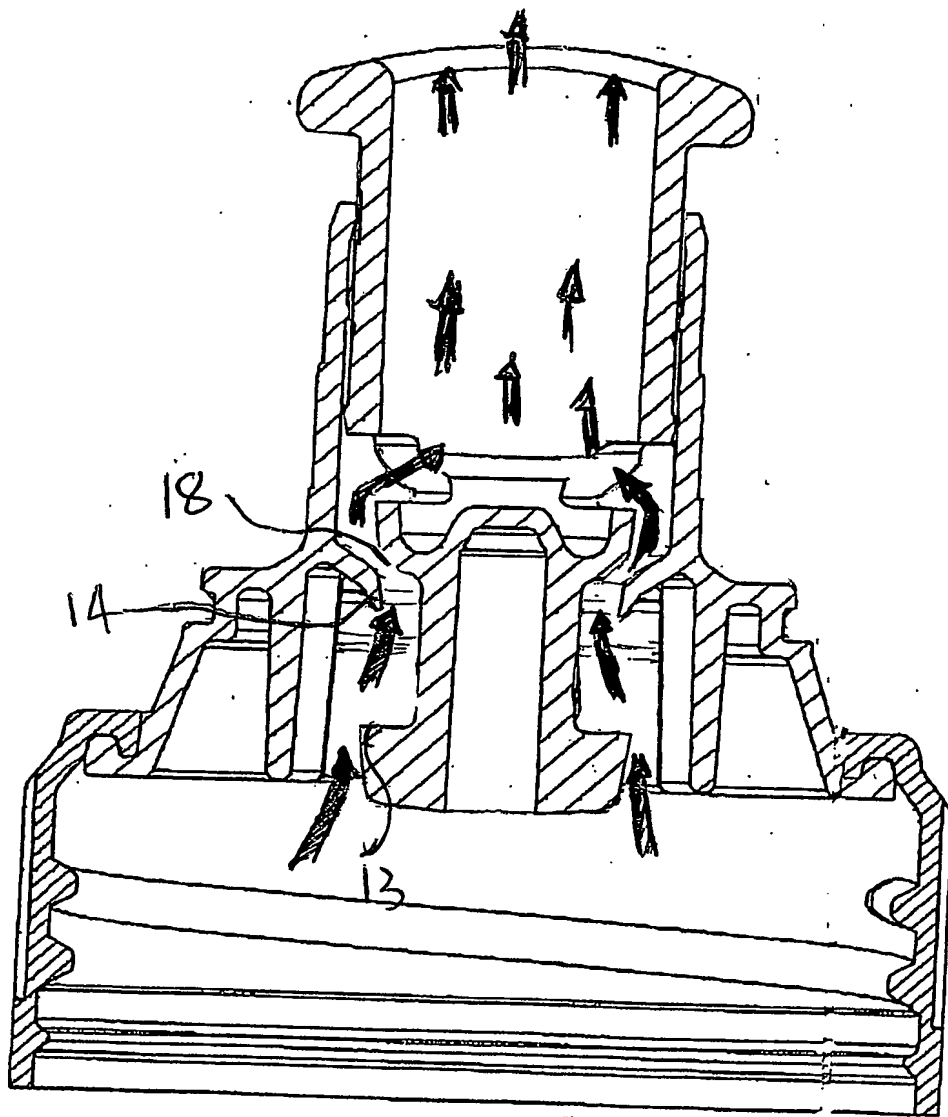


FIG 9

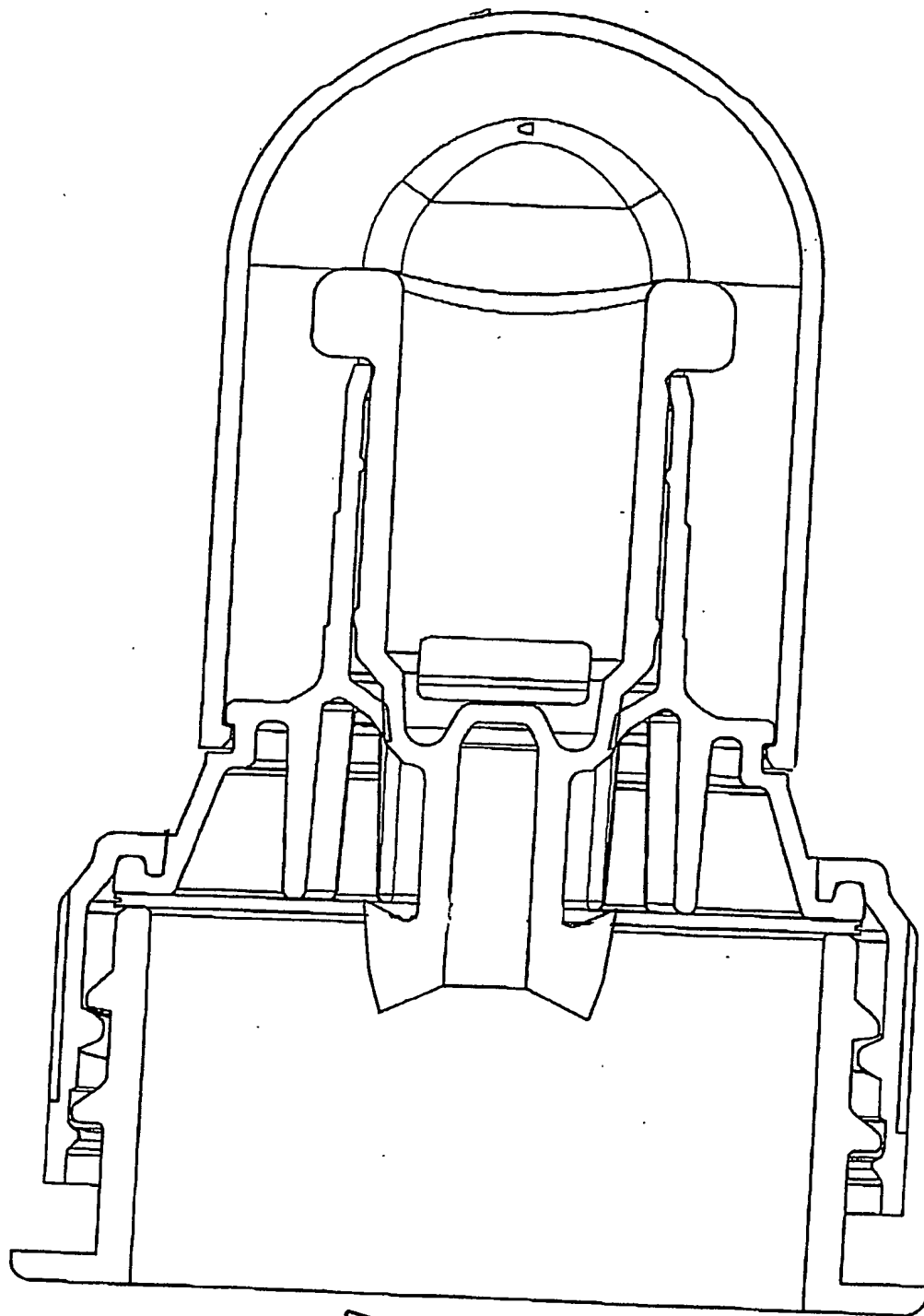


FIG 10

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